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ABSTRACT

Research is described which explores the hypothesis that different classroom situations may be optimal for different individuals. The approach used cluster analysis to identify student and classroom "types" whose interactions were then examined in an analysis of variance framework. About 1,300 fourth graders from 50 classrooms were involved in the study which incorporated classroom observations, teacher comments, student questionnaires, and achievement tests. Cluster analysis resulted in the identification of six classroom types ranging from permissive, warm, individualized atmospheres to highly controlled, cold, nonindividualized atmospheres. Three student types were low achievers lacking self-direction and confidence, highly motivated self-confident achievers, and strongly autonomous self-directed moderate achievers. A summary of major trends shows that low achieving boys did best in warm classes with moderate control, highly motivated boys did best in controlled classes which allow for student initiative, and autonomous boys did best in permissive classes which allow for student initiative. Low achieving girls did best in warm and individualized classes; high achieving girls did best in classes combining warmth, control, and orderliness; and autonomous girls did best in warm classes emphasizing student expressiveness. Major sex differences are enumerated, also. (Author/AV)

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Interactions Between Child-Types and Classroom-Types

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The idea that different situations may be optimal for different individuals (i.e., that persons and situations interact) seems a logical and attractive one, but cannot be said to have been overwhelmingly supported in the research that has been done to date. Much of this prior research has utilized experimentally-manipulated situations and small numbers of individual characteristics, often treated one at a time. In the present investigation, naturally-occuring situations (classrooms) were observed and their characteristics reduced to a small number of "types" through the use of cluster analysis. The interaction of these "types" with a set of child-"types" (derived by cluster-analyzing the children on the basis of measures of various individual characteristics) was then investigated with analyses of variance. The benefit of a cluster approach is that it allows for the comparison of naturally-occuring types in their multivariate complexity; this seems an advantage over looking at the effects of abstracted individual dimensions, particularly if practical applications of the results are envisaged.

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Each of 50 fourth-grade classrooms (in 26 schools) was observed on eight separate one-hour occasions, spread throughout a school year, by eight different trained observers. The observers used a structured "sign" system to tally the occurrence of a large number of specific activities, teacher behaviors, and student behaviors; they also made a set of global ratings, at the end of the visit, concerning the general classroom atmosphere and the quality of the teacher and student activities. Observation reliability was assessed with an analysis of variance approach (classrooms by observers); items with low reliabilities (or

infrequent occurrence) were dropped from further analyses. Separate factor analyses were conducted with each section of the observation form (with scores for each item in each class summed across the eight observers who had visited the class). A questionnaire with which the teachers described their classroom organization and activities was also factor analyzed. There were eight classroom factor analyses in all, each rotated obliquely, producing a total of 33 factors. Factor scores from these factors were then used as input in a "second-order" factor analysis. This analysis produced six factors (rotated to orthogonal simple structure) which were given the following names:

1. Warmth, friendliness, involvement, interest, vs. coldness, hostility, boredom.
2. Teacher control, structure, orderly task orientation vs. permissiveness, spontaneity, lack of control.
3. Imposed, common, repetitive activities vs. student-initiated (and -maintained), varied, simultaneous activities.
4. Non-individualized vs. individualized teacher-student interaction, teacher consultative role.
5. Energetic teacher promotion of student academic participation.
6. Emphasis on student expressiveness, exploration, and creativity.

Next, the 50 classrooms were cluster-analyzed into groups with similar profiles in terms of factor scores on these six factors. Several cluster-analysis procedures were tried in this phase of the analysis. Although they showed some similarity, they did not produce identical results. A reduced set of "core" classrooms was therefore derived including only those which were grouped together by several different methods. A discriminant function analysis was then used to allocate each of the remaining classrooms to the "core" cluster which they most closely resembled. Six clusters were produced in this way, ranging in size from

six to ten classrooms. The following descriptions are based on the profile of mean factor scores for each cluster:

Cluster one classrooms were extremely permissive, lacked control and orderliness, had varied, student-initiated activities, were moderately warm, and tended to have individualized interaction between teachers and students. Although they showed some of the characteristics which have been attributed to "open" classrooms, their extreme lack of control and order was beyond that recommended in the ideal "open" classroom (where control is shared between teacher and students).

Cluster two classrooms were highly controlled and orderly, but students also had relatively great opportunity to initiate their own, varied, activities. These classes were non-individualized and tended to be relatively cold. These were classes in which students tended to direct their own activities, but in a structured and somewhat cold and impersonal setting.

Classrooms in the third cluster tended to be cold and unfriendly and to have common (whole class) activities. They were also moderately permissive, and moderately oriented toward both academic participation and student expressiveness.

Classrooms in the fourth cluster tended to be warm and also fairly tightly controlled. They tended not to emphasize student expressiveness and creativity, and were moderate with regard to student initiation of activities, individualized interaction, and encouragement of academic participation.

Fifth cluster classrooms were very warm and friendly, showed a strong emphasis on student expressiveness and a very low level of encouragement of academic participation. They were moderate on control, student initiation of activities, and individualization.

Classrooms in the sixth cluster tended clearly to encourage academic participation, and to have individualized teacher-student interaction. They did not emphasize student expressiveness, tended to have common activities, and were moderate on both the control and warmth dimensions.

There were about 1300 fourth-graders in these 50 classrooms. They were administered sets of parallel questionnaires at the beginning and end of the school year measuring creativity, inquiry skill, self-esteem, and several school-related attitudes and values. At the end of the school year they were also asked to evaluate their class and their benefit from it. An achievement test was also administered at the end of the school year. Scores from another achievement test taken a year earlier (at the end of third grade) were obtained from school records. Questionnaires measuring various motives, preferences and orientations were also administered in the fall. At the end of the school year, the teachers made ratings concerning the classroom behavior of each of the children in their classes.

Each of these sets of child measures was factor-analyzed. The achievement test subscores all contributed to a single factor, in both pre- and post-tests, as did the creativity measures and the inquiry measures. The value and attitude measures produced four factors (in both fall and spring administrations). These were called, "self-confidence," "value on equality," "concern for others," and "value on task self-direction." The orientation and motive measures also produced four factors, called "preference for class with autonomy and personal expression for students," "compliant, conforming orientation," "personal control, intrinsic motivation," and "achievement motivation."

The next step was to derive clusters of children according to similarity between profiles of individual characteristics. Eleven factors (plus one additional measure), representing status at the beginning of the school year, comprised these profiles: the four orientation and motive factors, the four attitude and value factors (from the fall administration), the prior achievement test factor, the pre-test inquiry and creativity factors, and a measure of writing quality (rated from the responses to the pre-test inquiry skill items). Because

the cluster analysis programs available to us could not handle a sample of this size, 12 subsamples were randomly selected, and each of these cluster-analyzed, using a procedure described by Overall and Klett. Each of the resulting clusters from the 12 subsamples was then input into a new cluster analysis. This produced three clusters with distinctly different profile component means:

Members of the first cluster were low prior achievers who were not intrinsically motivated, not oriented toward others, lacked self-confidence, scored high on "compliant, conforming orientation," and moderately on "achievement motivation" and "self-direction."

Children in the second cluster tended to be highly motivated, self-confident prior achievers. They also scored low on self-direction and autonomy and were moderately compliant.

Third-cluster members stated strong preferences for autonomy, personal expression, and self-direction. They scored quite low on "compliant orientation," Their prior achievement and motivation scores were moderate, except for "achievement motivation" which was low.

A series of analyses of variance was done to investigate child-cluster by classroom-cluster interactions (plus main effects). Sex was also included as an independent variable in these analyses. Because it seemed most appropriate for the classroom to be the unit of analysis, a mean score was derived, within each classroom, for each sex by person-cluster cell, for each dependent variable. Repeated-measures analyses of variance were then run, with classroom-cluster as a non-repeated independent variable, and child-cluster and sex as repeated independent variables (within classrooms).

There were fourteen dependent variables in these analyses. For each of the measures which had parallel pre- and post-scores, residual gain scores were calculated with a regression analysis. These included the measures of achievement,

creativity, inquiry skill, and writing quality, the four attitude and value factors, and a measure of self-esteem (included separately because of its general interest, although it also contributed--fairly weakly--to the "self-confidence" factor). Two factors derived from the teachers' ratings of the students (called "perseverance, social maturity," and "activity curiosity"), and three factors derived from the students' self- and class-evaluations (called "enjoyment of class," "social involvement," and "perceived disruptiveness in class") were also included as dependent variables in the analyses of variance.

The independent variables representing persons (sex and child-cluster) produced more significant main effects than did the classroom variable (class-clusters). Sex significantly differentiated 10 of the 14 variables. Girls scored higher with most of these variables, with the exceptions of "value on self-direction" and "activity, curiosity" for which boys did. The child-clusters also produced 10 significant main effects. These generally slightly favored cluster two, although in several instances (with creativity, writing quality, value on equality, concern for others, and activity/curiosity) cluster three was not significantly lower, and in one (value on self-direction) it was higher. The classroom clusters showed significant main effects with only three of the dependent variables: With achievement test performance, clusters two and four, both characterized by control and orderliness, were highest. With activity/curiosity, cluster five (warm, and emphasizing student expressiveness), and one (extremely permissive and varied), were highest. Perceived class disruptiveness showed highest scores for cluster three, the coldest and most hostile grouping. In addition, a borderline effect was found for creativity (with cluster five, the group which combined warmth with a strong emphasis on student expressiveness and creativity, scoring highest).

There were nine significant person by classroom-cluster interactions, involving seven of the fourteen dependent variables (these include interactions

for sex by class-cluster, child-cluster by class-cluster, and sex by child-cluster by class-cluster). There were two sex by class-cluster interactions: One affected activity/curiosity (boys were rated highest on this variable in class-cluster five--the one which was warm and emphasized expressiveness; while girls were highest in clusters three and one, both of which tended toward permissiveness and were also moderate-to-high on expressiveness). The other sex by class-cluster interaction influenced self-esteem, which was highest for boys in warm and controlled classes, and highest for girls in warm and expressive classes.

Child-cluster by class-cluster interactions were also obtained with two dependent variables, activity/curiosity and creativity. Both the low achieving, compliant and the autonomous children were most active and curious in the most permissive (least controlled) class type, while the high achieving, motivated children were most active in the classes which emphasized expressiveness and were warm and friendly. All three types of children scored high on creativity in the warm and expressive classes, but children in clusters two and three also did well in class-cluster four (warm, controlled, orderly), and cluster three children (those preferring autonomy) did well in class-cluster two (which combined control and orderliness with student initiation of varied activities).

Five dependent variables were influenced by three-way interactions (child-cluster by sex by class-cluster): self-esteem, self-confidence, value on equality, concern for others, and perseverance/social maturity. Although there were some differences between the results for the different dependent variables, we will summarize the major trends. On the whole, the low achieving, compliant (cluster one) boys did best in warm and expressive classes with moderate control (class cluster five); the motivated, high achieving boys (cluster two) did best in classes which were controlled and orderly but also allowed for student initiative and varied activities (cluster two); and the boys who valued autonomy and personal expression

(cluster three) did best in classes which were permissive, and provided for much autonomy and student initiation of activities (class-cluster one). At the same time, the cluster one (low achieving, etc.) girls performed well in both the warm, expressive (cluster five) and the individualized (cluster six) classes; the cluster two (high achieving, motivated) girls did best in cluster four classrooms (combining warmth with control and orderliness), and the cluster three (autonomous expressive orientation, etc.) girls did best in class-cluster five (combining warmth with an emphasis on student expressiveness). The major differences between the sexes in these interactions were: 1) low achieving, compliant girls did relatively well in classes which provided for individualized teacher-student interaction, in addition to the warm, expressive classes favored by both sexes in this child cluster; 2) the motivated, high achieving children of both sexes did well in classes which were controlled and orderly; however boys did best in classes which combined this orderliness with student-initiated activities, girls in those which combined it with warmth and friendliness; 3) the boys who were oriented toward autonomy and personal expression did best in the classes which provided for much student autonomy, while the girls so-oriented did best in classes which emphasized greater student expressiveness.

While this study's results agree with those of many others in demonstrating the primacy of individual characteristics in predicting achievement-related outcomes, it also demonstrates substantial influence on these outcomes by person-by-situation interactions. The approach demonstrated in this research, using cluster analysis to identify person and situation "types" whose interactions are then examined in an analysis of variance framework, seems a potentially useful one and, in our opinion, merits further exploration, and attempts to spell out theoretical and practical implications.